

Supplemental Preliminary Amendment
Serial No.: 10/531,585.
Attorney Docket No. 052477

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims

1. (Previously presented): An ignition device for internal combustion engine comprising:
 - a main chamber intended for containing a main combustible mixture and fitted with a compression system of said mixture; and
 - an igniter comprising a precombustion chamber intended for containing a combustible mixture and an ignition system of the combustible mixture contained in the precombustion chamber, the precombustion chamber being defined by a precombustion chamber body having a head including passageways, the head of the pre-heating body separating the precombustion chamber from the main chamber and communicating the precombustion chamber and the main chamber through the passageways, wherein the passageways comprise at least one passageway enabling the propagation of a flame front from the precombustion chamber to the main chamber when the engine operates on low load and at least one passageway not enabling the propagation of a front flame from the precombustion chamber to the main chamber while enabling the passageway of the precombustion chamber to the main chamber of unstable compounds derived from the combustion of the combustible mixture in the precombustion chamber.

2. (Currently amended): A device according to claim 1, wherein the number of passageways enabling the propagation of a flame front provided in the head of the precombustion

Supplemental Preliminary Amendment
Serial No.: 10/531,585
Attorney Docket No. 052477

chamber body is 1 to 5, ~~preferably 1~~.

3. (Currently amended): A device according to claim 1, wherein the number of passageways not enabling the propagation of a flame front is 1 to 20, ~~preferably 3 to 15~~.

4. (Currently amended): A device according to claim 1, wherein the passageway(s) enabling the propagation of a flame front have a diameter greater than 1 mm up to 3 mm, ~~preferably up to 1.5 mm~~.

5. (Currently amended): A device according to claim 1, wherein the passageways not enabling the propagation of a flame front have a diameter ≤ 1 mm, ~~preferably 0.5 to 1 mm~~.

6. (Previously presented): A device according to claim 1, wherein the head of the precombustion chamber body has the shape of a spherical cap.

7. (Previously presented): A device according to claim 6, wherein the passageways are oriented following radii of the spherical cap.

8. (Currently amended): A device according to claim 1, wherein the precombustion chamber body is a metal alloy having a thermal conductivity at 20°C of at least 10 W/K/m, ~~preferably at least 30 W/K/m~~.

9. (Previously presented): A device according to claim 8, wherein the alloy is a copper alloy.

10. (Previously presented): A device according to claim 9, wherein the alloy is the alloy Cu Cr 1 Zr.

11. (Previously presented): A device according to claim 1, wherein the internal wall of the precombustion chamber body and/or the external wall of the head of the precombustion chamber

Supplemental Preliminary Amendment
Serial No.: 10/531,585
Attorney Docket No. 052477

body and/or the walls of the passageways are coated with a refractory coating layer.

12. (Previously presented): A device according to claim 11, wherein the refractory coating layer is selected among: Al_2O_3 , ZrY and TiB_2 .

13. (Currently amended): A device according to claim 11, wherein the refractory coating layer has a thickness of 0.5 to 100 μm , ~~preferably 1 to 50 μm .~~

14. (Original): A method for igniting an internal combustion engine wherein:

- a main combustible mixture is introduced into a main chamber and a combustible mixture in a precombustion chamber communicating with the main chamber through at least one passageway enabling the propagation of a flame front and at least one passageway not enabling the propagation of a flame front ;
- the combustible mixture contained in the precombustion chamber is burnt; and
 - a) for low load operation of the engine:
 - at least one flame front is let through from the precombustion chamber to the main chamber via the passageway enabling the propagation of a flame front and the main combustible mixture is ignited via the flame front ;
 - b) for high load operation of the engine ;
 - unstable compounds from the combustion of the combustible mixture from the precombustion chamber while preventing any propagation of a flame front, are passed from the precombustion chamber to the main chamber, via the passageways, and the main combustible mixture seeded with the unstable compounds undergoes mass self-ignition in the main chamber.

Supplemental Preliminary Amendment
Serial No.: 10/531,585
Attorney Docket No. 052477

15. (Currently amended): An igniter for combustion engine comprising a precombustion chamber defined by a precombustion chamber body having a head fitted with passageways, the precombustion chamber being intended for containing a combustible mixture, and an ignition system of the combustible mixture contained in the precombustion chamber, wherein the precombustion chamber head comprises at least one passageway having a diameter greater than 1 mm up to 3 mm, ~~preferably up to 1.5 mm~~, and at least one passageway having a diameter equal to or smaller than 1 mm, ~~preferably 0.5 to 1 mm~~.

16. (Currently amended): An igniter according to claim 15, wherein the precombustion chamber head comprises 1 to 5 passageways of diameter greater than 1 mm, ~~preferably 1~~.

17. (Currently amended): An igniter according to claim 15, wherein the precombustion chamber head comprises 1 to 20 passageways of diameter smaller than or equal to 1 mm; ~~preferably 3 to 15~~.

18. (Previously presented): An igniter according to claim 15, wherein the precombustion chamber head is a spherical cap.

19. (Previously presented): An igniter according to claim 18, wherein the passageways are oriented following radii of the spherical cap.

20. (New): A device according to claim 2, wherein the number of passageways enabling the propagation of a flame front provided in the head of the precombustion chamber body is 1.

21. (New): A device according to claim 3, wherein the number of passageways not enabling the propagation of a flame front is 3 to 15.

Supplemental Preliminary Amendment
Serial No.: 10/531,585
Attorney Docket No. 052477

22. (New): A device according to claim 4, wherein the passageway(s) enabling the propagation of a flame front have a diameter greater than 1 mm up to 1.5 mm.

23. (New): A device according to claim 5, wherein the passageways not enabling the propagation of a flame front have a diameter 0.5 to 1 mm.

24. (New): A device according to claim 8, wherein the precombustion chamber body is a metal alloy having a thermal conductivity at 20°C of at least 30 W/K/m.

25. (New): A device according to claim 13, wherein the refractory coating layer has a thickness of 1 to 50 μm .

26. (New): An igniter according to claim 15, wherein the precombustion chamber head comprises at least one passageway having a diameter greater than 1 mm up to 1.5 mm, and at least one passageway having a diameter 0.5 to 1 mm.

27. (New): An igniter according to claim 16, wherein the precombustion chamber head comprises 1 passageway of diameter greater than 1 mm.

28. (New): An igniter according to claim 17, wherein the precombustion chamber head comprises 3 to 15 passageways of diameter smaller than or equal to 1 mm.